PATENT COOPERATION TREATY

PCT

REC'D 28 SEP 2005
WIPO PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AA 1140	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI2004/000496	International filing date *(day/month/year)* 25.08.2004	Priority date *(day/month/year)* 25.09.2003
International Patent Classification (IPC) or national classification and IPC B02C 13/08, D21B 1/10		
Applicant Kiviaho, Jouko		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
29.04.2005	19.09.2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Mats Raidla / MRo Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/000496

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-11 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 12-15 received by this Authority on 29.04.2005
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-4 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/000496

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-10	YES
	Claims		NO
Inventive step (IS)	Claims	1-10	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US 2448849 A
D2: US 3986676 A
D3: US 3643879 A

The cited documents represent the general state of the art. The invention defined in amended claims 1-10 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed method and apparatus for liberating paper and/or paperboard material. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in amended claims 1-10 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Claims

1. A method for fiberizing particularly paper and/or paperboard based material, for feeding fiberized material, such as pulp wool, wood fiber or the like, subsequently to a further process, such as its application site, intermediate storage, shipping and/or the like, the fiberization being performed by means of a pulper (1), which is provided with a primary space (A) for processing the material to be fiberized with a knife assembly (1a) included therein and rotating around a rotation axis (s), wherein by the action of its rotation (w) the material to be processed is preprocessed for fiberization by means of a primary knife unit, belonging to the knife assembly, whereafter it is being fiberized by means of a secondary knife unit, belonging to the knife assembly, and by leading it subsequently through a screen assembly (1b) associated with, such as surrounding the knife assembly, into a secondary space (B) present in the pulper (1), for supplying the fiberized material further through an expulsion opening (UA) of the pulper (1) to further processing, **characterized in that** the material to be fiberized is preprocessed by means of a primary knife unit (1a'), which has at least two members and/or is placed in a supply opening (x12) in a way that it is able to preprocess essentially all of the material to be fed into the pulper (1), whereafter the material is being finally fiberized by forcing it to pass between vanes (1a"1), included in the secondary knife unit (1a") and disposed in overlying positions divergent relative to each other, the thickness of the vanes being between 5 - 20 mm.

2. A method as set forth in claim 1, **characterized in that** the material to be fiberized is

preprocessed by a primary knife unit (1a') which has at least two members, whereby first knife members (1a'1) included in the primary knife unit (1a') are disposed in a plane substantially coincident with the vanes (1a"1) of the secondary knife unit (1a") for rotation together therewith, and second knife members (1a'2) are adapted to be integral with the first knife members (1a'1) and to protrude therefrom in a direction essentially away from the knife assembly (1a).

3. A method as set forth in claim 1 or 2, wherein the fiberization is performed essentially as a dry process, **characterized in that** the material to be fed into the pulper (1) and/or to be fiberized therein is supplied with one or several additives (XY), such as boric acid, borax and/or the like, particularly for enhancing the thermal/fire resistance properties, decay resistance properties and/or the like of a resulting product, such as pulp wool, wood fiber or the like to be used as thermal insulation.

4. A method as set forth in any of the preceding claims 1-3, **characterized in that** the material to be fiberized and/or the additive (XY) is fed to the fiberization process from a supply assembly (x1) in connection with the pulper (1), such as from one or several supply pockets (x11), supply openings (x12) and/or the like, in response to an underpressure provided essentially by the rotary motion (w) of the knife assembly (1a).

5. An apparatus for fiberizing particularly paper and/or paperboard based material, for feeding fiberized material, such as pulp wool, wood fiber or the like, subsequently to a further process, such as its application site, intermediate storage, shipping and/or the like, said apparatus comprising a pulper

(1), which is provided with a primary space (A) and a knife assembly (1a) included therein and rotating around a rotation axis (s), which comprises a primary knife unit for preprocessing of the material to be fed into the pulper (1) for fiberization and a secondary knife unit, by which the material to be processed is fiberized by forcing it by the action of the knife assembly's (1a) rotation (w) through a screen assembly (1b) associated with, such as surrounding the knife assembly, into a secondary space (B) present in the pulper (1), for supplying the fiberized material further through an expulsion opening (UA) of the pulper (1) to further processing, **characterized in that** a primary knife unit (1a') included in the knife assembly (1a) is adapted to consist of at least two members and/or to be placed in a supply opening (x12) in a way that it is able to preprocess essentially all of the material to be fed into the pulper (1), and that a secondary knife unit (1a") consists of vanes (1a"1), disposed in overlying positions divergent relative to each other and the thickness of which being between 5 - 20 mm.

6. An apparatus as set forth in claim 5, **characterized in that** first knife members (1a'1) of the primary knife unit (1a'), consisting of at least two members, are disposed in a plane substantially coincident with the vanes (1a"1) of the secondary knife unit for rotation together therewith, and second knife members (1a'2) are adapted to be integral with the first knife members (1a'1) and to protrude therefrom in a direction essentially away from the knife assembly (1a).

7. An apparatus as set forth in claim 5 or 6, **characterized in that** the second knife members (1a'2) of the primary knife unit (1a') are adapted to be perpendicular to the first knife members (1a'1).

8. An apparatus as set forth in any of the preceding claims 5-7, **characterized in that** the pulper (1) has in connection therewith a supply assembly (X1) for supplying the pulper (1) with a material to be fiberized and/or with one or several additives (XY), such as boric acid, borax and/or the like, particularly for enhancing the thermal/fire resistance properties, decay resistance properties and/or the like of a resulting product, such as pulp wool, wood fiber or the like to be used as thermal insulation, from one or several supply pockets (x11), supply openings (x12) and/or the like, in response to an underpressure provided essentially by the rotary motion (w) of the knife assembly (1a).

9. An apparatus as set forth in any of the preceding claims 5-8, **characterized in that** at least the primary knife unit's (1a') first knife members and/or second knife members are designed in the form of elongated and radially disposed vanes (1a'1/ 1a'2), having a thickness of 5-20 mm, most preferably 10 mm.

10. An apparatus as set forth in any of the preceding claims 5-9, **characterized in that** the clearance (v) between the secondary knife unit (1a") and the screen assembly (1b) is within the range of 10-50 mm, most preferably 20 mm, and/or that the screen assembly (1b) has a screen capacity within the range of 30-50%, most preferably 40%.